

**Remarks:**

This response is intended to be a complete response to the office action of May 16, 2006 and the case is believed to be in condition for allowance. Accordingly, reconsideration is respectfully requested.

Claims 2-9, 12-14, 16, 17, 20-26, and 28-53 were rejected in the office action. Claim 8 has been amended herein. Claims 2-9, 12-14, 16-17, 20-26, and 28-53 are pending in the application.

**35 USC 103**

All the pending claims are rejected under 35 USC 103(a) as unpatentable over various combinations of references. Applicants respectfully traverse the rejections.

The following table summarizes the rejections:

Office Action Paragraph	3	4	5	6	7	8
2- 7,9,42- 8,13,20,30	44	12	41,48,51-53	14,16,17,21- 25,28,29,31- 35,37- 47,49,50	26,45-	36

**Avionics Radio**

Lindemann 6,529,710 x

**Telephony/DSL**

Isaksson	6,493,395	x	x			
Cioffi	6,473,438		x	x	x	
Matsumoto	6,522,731			x		x

Bae	5,832,387		x	x
Van				
Kerchove	5,812,599		x	

Oil Field

Gardner	5,365,229	x	x	x	x	x
Baird	6,469,636		x			

(The references will be referred to hereinafter by the last name of the first named inventor, respectively.)

As can be seen in the table above, in the rejection of each set of claims, the Examiner has relied on combinations of at least three references. In each instance the references come from quite remote fields of endeavor.

In each of these rejections the Examiner has argued that all the elements may be found in a combination of elements selected from the various cited references. However, the mere identification of elements from various prior art references that may somehow be assembled into the claimed invention is not sufficient to negate patentability. If that were the case, very few patents would ever issue. *In re Rouffet*, 149 F3d 1350, 1357 (Fed. Cir. 1998). “Rejecting patents solely by finding prior art corollaries for the claimed elements would permit an examiner to use the claimed invention as a blueprint for piecing together elements in the prior art to defeat the patentability of the claimed invention.” *Ibid.*

“To establish obviousness based on a combination of the elements disclosed in the prior art, there must be some motivation, suggestion or teaching of the desirability of making the specific combination that was made by the applicant.” *In re Kotzab*, 217 F.3d

1365, 1370 (Fed. Cir. 2000). As argued herein below, that motivation, suggestion or teaching is absent in the rejection of each set of claims. Accordingly, Applicants respectfully request withdrawal of the rejections and allowance of the claims.

Rejection of Claims 8, 13, 20, and 30

The Examiner rejected Claims 8, 13, 20, and 30 as unpatentable over Gardner in view of Isaksson, and further in view of Lindemann.

*Gardner* teaches a prior art well-logging telemetry system for use on wireline logging systems. *Gardner* describes “a wireline telemetry system that uses multilevel correlative coding to provide high data rates and adaptive equalization to deal with the variation in channel distortion” (Col. 2, line 1-4). Gardner recognizes that the hostile environment for logging tools places severe demands on the wireline telemetry because of the variations in logging cable characteristics (*Gardner*, Abstract). Uplink data signal, the downlink data signal and the tool power are frequency multiplexed on the cable to avoid interference (*Gardner*, Col. 3. lines 7-9). *Gardner* teaches a telemetry system in which data is transmitted on a single carrier. The Examiner has correctly observed that *Gardner* “does not disclose the apparatus having logic operable to cause transmission of the bitstream as analog signals on a plurality of carrier frequencies and logic operable to receive the analog signals on the plurality of carrier frequencies and optimizing the total transmission power applied to the wireline in response to a received adjustment signal (Office Action, Page 4, Lines 1-4).

*Isaksson* describes a DMT system as implemented in a multi-carrier system for the installed copper network (“MUSIC is intended to provide high-speed communication on telephone copper wire pairs for supporting broadband multimedia services”, *Isaksson*, Col. 6, lines 23-24). This system provides transmission over copper cables up to a length of 1300 meters (*Isaksson*, Col. 6, Lines 33-34).

*Motivation to combine Gardner and Isaksson.* “The motivation, suggestion or teaching [of the proposed combination] may come explicitly from statements in the prior art, the knowledge of one of ordinary skill in the art, or in some cases the nature to be solved.” *In re Kotzab*, at 1370. In the present case there is no teaching or suggestion in either *Gardner* nor in *Isaksson* to combine the teachings of the one with the other. The Examiner has found the motivation in that “since *Isaksson* et al. states DMT modulation handles frequency dependent loss and noise in cables in an efficient manner and also provides high bit rate traffic over the cables (column 1, lines 14-23 and column 7, lines 5-20)” (Office Action, Page 4, Lines 17-19).

“To support the conclusion that the claimed combination is directed to obvious subject matter, either the references must expressly or implicitly suggest the claimed combination or the examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to be obvious in light of the teachings of the references.” *Ex parte Clapp*, 227 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985). That is not the case here. The motivation that *Isaksson* states that DMT modulation handles frequency dependent loss and noise in cable in an efficient manner and also provides high bit rate traffic over cables is neither an express or implicit suggestion to use *Isaksson*’s

DMT system for the installed copper network in an oil well well-logging apparatus such as taught by Gardner.

“The Examiner must show reasons that the skilled artisan, confronted with the same problems as the inventor and with no knowledge of the claimed invention, would select the elements from the cited prior art references for combination in the manner claimed.” *In re Rouffet*, at 1358. In *Rouffet* the court stated that because “the Board did not explain the specific understanding or principle within the knowledge of a skilled artisan that would motivate one with no knowledge of [the] invention to make the combination, this court infers that the examiner selected these references with the assistance of hindsight.” *In re Rouffet*, at 1358. That appears to be the case here. There is nothing to indicate that person of ordinary skill in the art facing the problem of improving telemetry systems for well logging, e.g., systems such as *Gardner*, would realize a need for “handling frequency dependent loss and noise”. *Gardner*’s telemetry systems were not confronted with frequency dependent loss and noise in that *Gardner* transmits in a single carrier frequency. Thus, it is not logical that a person of ordinary skill in the art would be motivated to combine these references on the notion that Isaksson et al. states DMT modulation handles frequency dependent loss and noise in cables in an efficient manner and also provides high bit rate traffic over the cables because that was not a problem faced in *Gardner*.

“A critical step in analyzing the patentability of claims pursuant to section 103(a) is casting the mind back to the time of the invention, to consider the thinking of one of ordinary skill in the art, guided only by the prior art references and the then-accepted-

wisdom in the field.” *In re Kotzab*, at 1369. An analysis of the Examiner’s reasoning would reveal a sort of circular argument is being applied which presupposes the existence of a system that provides multi-carrier transmission in a well-logging wireline system. Because only then could the problems that the Examiner states as motivation to combine Gardner and Isaksson arise. Accordingly, it is evident that a hindsight analysis has been employed not only in finding the elements of the claims in various references, but also in providing the motivation to combine these references.

Expectation of success.

“A proper analysis under § 103 requires … consideration of … whether the prior art would also have revealed that [in making the claimed device] those of ordinary skill in the art would have a reasonable expectation of success.” *In re Vaeck*, 947 F.2d 488, 493 (Fed. Cir. 1991), *citing*, *Dow Chemical Co.*, 837 F.2d 469, 473, 5 U.S.P.Q.2D (BNA) 1529, 1531 (Fed. Cir. 1988). “Both the suggestion and the reasonable expectation of success must be founded in the prior art, not in the applicant’s disclosure.” *Id.* The evidence in the present case does not support a conclusion of reasonable expectation of success in combining Gardner and Isaksson.

Isaksson discusses that “MUSIC is intended to provide high-speed communication on telephone copper wire pairs for supporting broadband multimedia services.” Isaksson, Col. 6, lines 20-24. As discussed in the Declarations of Dr. Lloyd Clark and Mr. Michael Montgomery filed in the parent case on December 12, 2005 a person of ordinary skill in the art would not expect success from applying known DMT techniques to wireline telemetry systems for well-logging. Declaration of Dr. Lloyd

Clark, page 3, Declaration of Mr. Montgomery, pages 2-6. One reason for that lack of expectation of success is the length of the cables involved. There is no evidence that there would be a reasonable expectation of success for providing such service on oil field well-logging cables. A typical wireline cable exceeds 30,000 feet. Isaksson explicitly states that “the cable length specification for MUSIC can be successfully limited to 1300 meters. Isaksson, Col. 6, lines 33-34. There is nothing in Isaksson to suggest it’s applicability to longer cables. Another difficulty in applying DSL techniques to the wireline environment are the difficult operating conditions.

Initial experimentation by the inventors illustrated the difficulty in taking existing DSL equipment to the wireline cables. These experiments demonstrated that DMT-based ADSL modems could not establish a communications link when used over a 30,000-foot length of well-logging wireline cable. Lloyd Declaration, Page 3.

Thus, there is no reasonable expectation of success in applying the DSL techniques of Isaksson to the oil field well-logging telemetry system of Gardner.

Lindemann.

The rejection of Claims 8, 13, 20, and 30 further requires the combination of the *Gardner* and *Isaksson* references with *Lindemann*. The Examiner recognizes that *Gardner* and *Isaksson* lack a teaching of “optimizing the the (sic) total transmission power applied to the wireline in response to a received adjustment signal transmitted from the uphole telemetry unit wherein the adjustment signal is a function of cable length, cable material, cable temperature, and cable geometry; wherein the uphole

telemetry units includes logic includes logic (sic) to repeatedly measure the received signal amplitude and to transmit the received adjustment signal in response to the measurement to the downhole telemetry cartridge" (Office Action, Page 4, Lines 3-9).

*Lindemann* teaches a system for providing multi-channel communication over radio transmission and adjusting the output power at the antenna of a radio system by determining the power level difference between the signal source and system antenna. *Lindemann*, Col 3., Lines 14-18. The *Lindemann* system addresses the variations in output power of radio systems that are due to the variations in cable types and cable lengths from installation-to-installation. It should be noted that *Lindemann* is primarily concerned with radio systems installed in aircraft for communication with satellites. Figure 1 is a schematic illustration of the installation which *Lindemann* addresses. Figure 1 illustrates ... the avionics forming a satellite communications system. The system includes a high power amplifier 104, a diplexer and low noise amplifier 106, and a low gain antenna 108. *Lindemann*, Col. 6, Lines 42-50. A radio control subsystem 112 is coupled using a length of coaxial cable (TX1) to the high power amplifier 104 and the high power amplifier 104 is coupled to the diplexer low noise amplifier 106 through a second cable (TX2). It is variations in the characteristics of these two cables (TX1 and TX2) that concern *Lindemann*. *Lindemann* points out, however, "the transmission cable (TX1) ... is of a fixed type and length for any specific aircraft type original equipment manufacturer (OEM) installation" (*Lindemann*, Col. 7, lines 1-4) and "the transmission cable (TX2) ... is also of a fixed type and length for any specific aircraft type OEM installation" (*Lindemann*, Col. 11-14).

A first factual finding in an obviousness analysis is the determination of the scope and content of the prior art. *Graham v. John Deer Co.* 383 U.S. 1, 17, 86 S. Ct. 684, 15 L.Ed.2d 545 (1966), cited in, *Dystar v. Bann*, 2006 U.S. App. LEXIS 24642, \*9 (Fed. Cir. 2006). “In order to rely on a reference as a basis for rejection of the applicant’s invention, the reference must either be in the field of the applicant’s endeavor or, if not, then be reasonably pertinent to the particular problem with which the inventor was concerned.” *In re Oetiker*, 24 USPQ 2D 1443, 977 F.2d 1443, 1447 (Fed. Cir. 1992). In *Oetiker* the field of the invention was hose clamps and the field of the reference in question was garments. In particular, *Oetiker’s* invention was directed to the problem of fastening a hose clamp whereas the reference dealt with a fastener for a garment. Thus, in both instances fasteners used were a subject of the invention. The court arrived at the conclusion that the references could not be combined and in arriving at that holding stated that “It has not been shown that a person of ordinary skill, seeking to solve a problem of fastening a hose clamp, would reasonably be expected or motivated to look to fasteners for garments.” *Oetiker*, at 1447. Similarly, a person of ordinary skill seeking to improvements to oil field wireline telemetry, would not be motivated to look to RF avionics systems. When the problem to be solved is dealing with the dynamic nature of well-logging operations, the harsh conditions encountered in such applications, and the length of cables used, one would not dream of going to look at solutions on how do power management in an fixed circuit used in between a radio and an antenna in an airplane. The difference between these two systems are so vast and the problems encountered so different, that no person would consider there to be any purpose to look to

solutions in one to apply to the other. Accordingly, Lindemann is not a reference that is combinable with Gardner and is not a reference that should be used in the context of an obviousness analysis of Applicants' invention.

However, even if one were to consider Lindemann as a valid reference, the Examiner's logic as to motivation to combine is flawed. The Examiner argues that "it would have been obvious to one skilled in the art at the time the invention was made to modify system (sic) of Gardener (sic) et al. and Isaksson et al. with the transmission power control as taught by Lindemann since Lindemann et al. states the transmission power control compensates for power losses in the transmission cable (column 10, lines 45-47) caused by the length and type of cable (column 1, lines 57-61 and column 2, lines 41-44). However, that is not correct. The requirement that "the examiner must show reasons that the skilled artisan, confronted with the same problem as the inventor and with no knowledge of the claimed invention, would select the elements from the cited prior art references for combination in the manner claimed" (*in re Rouffet*, at 1357) is certainly not satisfied by the Lindemann reference. The claimed element of "logic to control the transmission power to optimize the total transmission power applied to the wireline cable in response to a received adjustment signal transmitted to the downhole telemetry cartridge from the uphole telemetry unit" is directed to establish an initial power level. Lindemann operates on a static system, namely, an RF system that has already been installed in an aircraft. Lindemann's transmission cable does not change during the course of an operation and from job-to-job. In applicant's system, as in Gardner, the cable may vary in operating characteristics from job-to-job and during the

operation of a job. Therefore, a person seeking to make improvements to the system of Gardner would not be motivated to look to the static system of Lindemann.

The Examiner has failed to provide a logical motivation to combine Gardner with Isaksson and Gardner, Isaksson, with Lindemann. The offered motivations for these two combinations are akin to the universal desire to improve existing processes and is no more than the implicit motivation which always exists to make products stronger, cheaper, cleaner, faster, lighter, smaller, more durable, or more efficient. *Dystar*, 2006 U.S. App. Lexis 24642, \*33. True, when successfully deployed, DMT is faster and more efficient than the prior art oil field telemetry systems. However, in such situations, i.e., when the motivation to combine is merely these implicit motivations that drive the desire for technological progress, “the proper question is whether the ordinary artisan possesses knowledge and skills rendering him capable of combining the prior art references.” *Dystar*, at \*33. Making DMT work in the oil field wireline well-logging environment was no small feat achieved by the inventors. Only through a great deal of effort and experimentation did the inventors achieve at the particular limitations that are claimed herein, for example, setting the overall power setting prior to determining bits-per-carrier and power-level per carrier (Claim 8). A person of ordinary skill in the art would not have had the knowledge to combine teachings from Lindemann with Gardner and Isaksson to include such an element.

Accordingly, there is a lack of motivation to combine Gardner with Isaksson, there is not a reasonable expectation for success, Lindemann is not analogous art, and there is a lack of motivation to combine Lindemann with Gardner and Isaksson. At least

for any one of these reasons, Claim 8 is not obvious over the Gardner, Isaksson, and Lindemann, taken singly or in combination.

*Combination of Cioffi and Gardner*

Claims 2-7, 9, and 42-44 are rejected as unpatentable over the combination of Cioffi, Gardner and Baird, Claims 14, 16, 17, 21-25,28,29,31-35,37-41, 48, 51-53 stand rejected as unpatentable over the combination of Cioffi, Gardner and Masumoto; Claims 26, 45-47,49,50 stand rejected over the combination of Cioffi, Bae, and Gardner; and Claim 36 stands rejected over the combination of Cioffi, Bae, Van Kerchove, and Gardner. Thus, common to these rejections is the combination of Cioffi and Gardner. That combination will be dealt with in this section.

The legal analysis presented herein above in support of claim 8 as to the proposed combination of DSL art, e.g., Isaksson, with Gardner is incorporated here by reference.

The courts have pointed out that “virtually all inventions are combinations of old elements.” In re Rouffet, at 1357. “If identification of each claimed element in the prior art were sufficient to negate patentability, very few patents would ever issue.” To prevent hindsight analysis using the claimed invention as a blue print, “the examiner must show reasons that the skilled artisan, confronted with the same problems as the inventor and with no knowledge of the claimed invention, would select the elements from the cited prior references for combination in the manner claimed.” In re Rouffet, at 1357.

In support of the motivation to combine Cioffi and Gardner the Examiner makes the statement that “it would have been obvious to one skilled in the art to modify the system in Gardner with DMT modulation and training as taught by Cioffi “since Cioffi et. al states DMT modulation avoids various signal distortion and noise problems (column 1, lines 21-25)” (Office Action, Page 9). Applicants disagree. The actual statement from Cioffi is that “among the benefits of DMT architectures is that they have high spectral efficiencies and *can adaptively* avoid *various* signal distortion and noise problems.” It is not clear what these various signal and noise problems are. Are these problems that occur on a dedicated single carrier system such as traditionally deployed in a well-logging wireline telemetry system?

Virtually every patent will state some advantage that comes from the use of the invention described therein. It is hard for the applicant to envision how any invention can be patentable if all the Examiner has to do is to point to some stated advantage in one of the references and conclude that from that advantage it would be obvious to modify another reference to incorporate the teachings of the former. “Rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” In re Kahn, 441 F.3d 977, 988, 78 USPQ.2D 1329 (Fed. Cir. 2006).

The Examiner’s suggested reason for the combination of Gardner and Cioffi presupposes that Gardner was faced with “signal distortion and noise problems”. However, there is no evidence that such is the case. Cioffi’s techniques are used to avoid signal distortion and noise problems in DMT systems. Thus, there is a presupposition

that a DMT system has been applied to Gardner and that certain problems would be worked out using Cioffi's techniques. As discussed herein above, applying DMT techniques in the oil field wireline well-logging environment is not at all obvious. For example, there is no reasonable expectation of success. Therefore, a person of ordinary skill in the art would not jump to looking to Cioffi for solutions to how to implement a DMT system in an oilfield wireline well-logging application without looking at applicants' invention for a blueprint to find out what techniques would be applicable. Then, having looked at the solution designed and claimed by the applicants, a person may find prior art references that teach those techniques in a different environment, e.g., Cioffi. In other words, only through hindsight analysis using applicant's invention would a person arrive at the observation to include, in an oil field implementation of DMT, for example, a training sequence that tunes the system and to perform that step repeatedly during the course of a logging job. (Claim 9)

Thus, the rationale offered by the Examiner for combining Gardner and Cioffi is merely an example of the implicit motivations that motivate progress of science generally. Such an implicit motivation to combine exists "when the 'improvement' is technology-independent and the combination of references results in a product or process that is more desirable, for example because it is stronger, cheaper, cleaner, faster, lighter, smaller, more durable, or more efficient." *Dystar*, at \*33. In such situations, i.e., when the motivation to combine is merely these implicit motivations that drive the desire for technological progress, "the proper question is whether the ordinary artisan possesses knowledge and skills rendering him capable of combining the prior art references."

*Dystar*, at \*33. As discussed herein above, and in the declarations of Dr. Clark and Mr. Montgomery, the ordinary artisan would not possess that knowledge. In the various cases cited in *Dystar* in which the patents in question were invalidated as obvious under the aforementioned standard, the modifications were relatively minute in nature. Consider, for example, *Pro-Mold & Tool Co., Inc. v. Great Lakes Plastics, Inc.*, 75 F.2d. 1568 (Fed. Cir. 1996). There the court did not require any evidence of motive. However, the modification of a card holder to only slightly larger than the trading card would easily be within the knowledge and skills of the ordinary artisan. The great leap forward of taking single-carrier oil field well-logging wireline telemetry to DMT modulation is much different and cannot be said to be within the knowledge and skill of the ordinary artisan.

For at least the foregoing reason, the combination of Cioffi with the oil field telemetry prior art is not supported by the evidence presented by the Examiner. Accordingly, independent claims 9, 14, 21, 28, and 29 are not obvious over any combination based on the combination of Cioffi and Gardner.

Baird

The Examiner has further relied on Baird in combination with Cioffi and Gardner for the rejections of Claims 2-7, 9, and 42-44. Like Gardner, Baird is an oilfield wireline telemetry reference. The reasoning refuting the proposed combination of Gardner and Cioffi also applies to a combination including Baird. Therefore, adding the Baird reference does not overcome the problems with the Gardner-Cioffi combination. Accordingly, Claim 9, is not obvious over the combination of Gardner, Cioffi, and Baird, whether the references are taken singly, or in any combination.

Gardner, Cioffi, and Isaksson

Claim 12 stands rejected as unpatentable over the combination of Gardner, Cioffi and Isaksson. To provide the motivations for the combinations of Gardner with Cioffi, and with Isaksson, the Examiner provides the same rationale as discussed herein above. For the same reasons given in support of Claims 8 and 9, there is no teaching, suggestion, or motivation to support the proposed combination.

Matsumoto

Claims 14, 16, 17, 21-25, 28, 29, 31-35,37-41, 48, 51-53 stand rejected as unpatentable over the combination of Gardner, Cioffi, and Matsumoto. The traversal of the combination of Gardner and Cioffi presented above is incorporated here by reference.

The Examiner has offered the reason that combining Gardner with Matsumoto comes from that Matsumoto states that DMT modulation can provide high speed digital communication. (Office Action, Page 16.) As with the reasons given in support of the combination of Gardner with Isaksson, Cioffi, and Lindemann, this is merely a restatement of the normal quest of technologists to seek to improve the performance of existing systems. It is this drive that moves technology forward. As discussed herein above, there is not many patents that do not claim some advantages such as efficiency, speed, etc. However, just because such an advantage may be achieved by one reference in the context of the operating environment of that reference, does not automatically result in a similar advantage when applied to another reference. As with the other references, an artisan would not have encountered the problems that must be solved in applying

DMT technology to oil field wireline telemetry systems without first having attempted to build such systems. Because there is no reasonable expectation of success in doing so, the artisan would not be motivated to attempt that underlying combination. Therefore, the artisan would not arrive at the opportunity to look to Matsumoto for solutions to those problems and thus, would not be motivated to combine the teachings of Matsumoto with Gardner.

Bae

Claims 26,45-47,49, and 50 stand rejected as unpatentable over the combination of Gardner, Cioffi, and Bae, and claim 36 stands rejected as unpatentable over the combination of Gardner, Cioffi, Bae, and Van Kerchove. As with the proposed combinations of Gardner with Isaksson, Cioffi, Lindemann, and Matsumoto, the Examiner merely provides a conclusory statement rather than a reason that the skilled artisan, confronted with the same problem as the inventor ... would select the elements from the cited prior art references for combination in the manner claimed. For the combination of Gardner and Cioffi with Bae, the Examiner offered the reasoning that a person would modify the well-logging method with the multi-carrier modulation and training as taught by Bae since Bae states multi-carrier modulation is the optimum modulation method in which data approximating channel capacity can be transmitted with a minimal error probability (Office Action, page 29). This as with the other references merely reiterates an advantage stated in the reference. For the same reasons given above, that is not sufficient to overcome the lack of a reasonable expectation of success, to provide the motivation to combine, and does not provide enough guidance to

an ordinary artisan. For the combination with Van Kerchove the Examiner states that the combination of Gardner, Bae, Cioffi, and Van Kerchove is obvious because “Van Kerchove states that his method allows the global capacity of the carriers to be enlarged and maximizes the minimum additional noise margins amongst the carriers which renders data transmission less sensitive for noise” (Office Action, Page 31-32). This obviously presupposes a multi-carrier modulation system in an oil field wireline well-logging environment. Thus, only through hindsight could the combination of Gardner with Van Kerchove be contemplated.

For all the foregoing reasons the independent claims are patentable over the cited prior art. The various dependent claims depend, respectively, from the independent claims and incorporate the limitations thereof. The dependent claims provide further unique and non-obvious combinations and are patentable for the reasons given in support of the independent claims and by virtue of such further combinations.

It is submitted that all the claims now in the application are allowable. Applicants respectfully request reconsideration of the application and claims and its early allowance. The Commissioner is hereby authorized to charge any fees associated with this response that may be required, or credit any overpayment, to Deposit Account 03-0330.

Respectfully submitted,

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